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NOTES ON THE LOCUST IN THE NORTH-WEST IN 1876.

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Having collected and published in the *Naturalist*, notes bearing on the appearance and movements of the locust, or devastating grasshopper, in Manitoba and the North-west Territory in 1874 and 1875; I propose briefly to put on record information obtained for 1876. The insect having drawn upon itself the attention of the western farmer, has at last become the subject of investigation by a Scientific Commission appointed last year by the Government of the United States. With the intelligent co-operation of the farmer, we are likely soon to know all that can be known about the locust, and what may be done to prevent its destructive increase.

Absence on the West Coast, and the pressure of other business, with the long time necessarily occupied in communicating with some parts of the far west, have prevented the earlier appearance of these notes.

Fortunately for the Province of Manitoba and the North-west Territory, the history of the movements of the locust within their limits in 1876 is not a long one. In 1875, as chronicled in the *Naturalist*, the locust hatched abundantly in Manitoba and its vicinity, and also in considerable numbers in the country near the foot of the Rocky Mountains. The swarms of Manitoba flew southward, while a great invasion of winged swarms from the south, occurred in the region west of Manitoba, where eggs were extensively deposited. From these eggs, with those which any small colonies of locusts remaining as residents in the country may have deposited, the swarms of 1876 were produced. No invasion of the region north of the 49th parallel from the south, occurred, except in the extreme west, where at Fort Walsh, flights are reported as arriving from Montana in the middle of July.

Over the greater part of the area defined northward by the 52nd parallel, and extending from the Rocky Mountains eastward to the 100th meridian, important hatching grounds were

scattered. These appear to have been specially numerous in the valley of the South Saskatchewan, as it is reported to have been owing to the destruction of the grass by the locusts that the northern herd of buffalo was forced so much further east than usual in 1876. True to their instincts, the broods, on arriving at maturity, flew southward and south-eastward, forming with additions from south-western Manitoba, and parts of Colorado, Wyoming and Dakota, the great army which overspread the Western States.

In the summer of 1876, the cultivated lands of Manitoba were threatened with locust invasions from two quarters, from both of which dangers they, however, fortunately escaped. The great hordes produced in the north-west might have overspread and devastated the province, as they have formerly done on several occasions. These, however, swept past by its western boundary and going southward, arriving in many of the south-western states too late to do much damage; whereas, had they visited Manitoba the loss would have been very great, owing to the less advanced condition of the crops. In south-western Minnesota locusts have bred annually since 1873, according to the reports of Mr. A. Whitman and Dr. Riley. In 1876 considerable swarms were produced, and these, on reaching maturity, set out on a migration to the north and north-westward, and might well have reached Manitoba. The determination of the locusts to move in this direction was evidenced (as has often before been noticed) by their waiting for favourable winds. They were, however, continually repulsed, and eventually borne back by the winds to their hatching places, and thence south and south-west to Iowa and Nebraska.

In an interesting article by Dr. Riley on the "Rocky Mountain Locust," in part reprinted in the last number of the *Naturalist*, I am glad to see that the preservation of the dry prairie grass in autumn and its firing, for the purpose of destroying the young insects in their breeding grounds in the far west, is warmly advocated. This was suggested in my notes on the invasion of 1874, and may yet, I believe, be carried out with good result.

Dr. Riley, in his valuable work on the Locust,* is in error with regard to the northern range of the insect, as represented in his coloured maps, especially that facing the title page; where

* The Locust or Grasshopper Plague, Chicago, 1877.

the areas designated as *frequently visited*, and *permanent breeding grounds* are made, together, to cover a breadth of about twenty degrees of longitude in the north, and to run beyond the 60th parallel of north latitude. The range of the locust is really limited to the north by the southern margin of the forest-clad country, and may be roughly defined by a line nearly as follows:—From the intersection of the 96th meridian and 49th parallel of latitude, to the south end of Lake Winnipeg, thence to Manitoba Lake, and following this lake and Winnipegosis Lake; from the north end of the latter westward to the Forks of the Saskatchewan, and thence nearly following the course of the Saskatchewan till the wooded country at the base of the Rocky Mountains is attained. It is not meant to affirm that single specimens of *Caloptenus spretus* may not be obtained beyond this limit, or even that small colonies may not exist from time to time; but the edge of the northern forest, with its climatic accompaniments, seems to constitute an absolute barrier to the destructive abundance of the insect. Further north, in the Peace River country, where prairies and tracts of lightly wooded land are extensive, I cannot learn, — though careful enquiry has been made on the subject, — that the locust swarms have ever been seen. At nearly all the Hudson Bay Company's posts more or less cultivation is carried on, and some record would have been kept of the appearance of the locust, had it occurred. Mr. S. D. Mulkins, of Battleford, to whom I wrote on this subject, says:—"From all the information I can collect, I cannot find that the grasshopper has ever visited any of the Hudson Bay Company's posts north of latitude 53°. I have never heard that they have ever penetrated to the Peace River country. To do so they would have to cross a wide belt of pine forest. Whether it is the scarcity of food in such places, or that there is something in the air that they do not like, the fact is, that they never in this country, to my knowledge, or that I can find out, have penetrated the wooded region. At Ft. à la Corne, Prince Albert Mission, Turtle Lake, Lac la Biche, Lac la Nun and Lac Ste. Anne, they have never been seen; and these places are all on the verge of the great forest, or just within its southern limit."

The immunity of the Peace River plains from the locust plague, constitutes a point of great importance in their favour, and may eventually render them, area for area, of considerably greater value than those of some parts of the Saskatchewan—a circumstance to be taken into consideration in planning a railway route.

In the following paragraphs, is given a brief digest of the more important facts bearing on the swarms of 1876 in the Northwest, obtained in answer to circulars and by correspondence. With the exception of the few notes placed last, the information from Manitoba is purely negative.

Mr. C. Mair has favoured me with the following note:—"In going to the Saskatchewan, last summer, I met the first hordes about the 26th of July, on the ground this side of the Little Saskatchewan. They were generally facing eastward, and seemed ready for flight. A few days afterwards, we met great flights of the insects, the air appearing to glisten with their motion. I felt no doubt whatever that their destination was Manitoba; but, as it afterwards appeared, they sheered off southwards before entering the Province, and did great damage in the States and Territories adjoining our boundary. From all I can learn at Carleton, etc., no eggs have been laid in our territory along the North Saskatchewan, and unless they come from the south, we shall be free from them this year."

Mr. A. L. Russell, of the Special Survey, sends the following notes: On June 19th, saw a few hoppers just out of the egg, a little west of Winnipeg. On July 16th, they were drifting past Fort Ellice, in clouds, to the south-eastward. At a place about forty miles north-west of Ellice, they were very numerous on August 4th, 5th, and 11th, flying north-westward on the 4th, south-eastward on the 5th and 11th. In this region of country they were to be seen almost daily from July 6th to August 10th. About a third of them were infected with parasites.

Mr. W. F. King writes, with regard to Battleford, that this place has been known to white men only since 1874, and that grasshoppers have not been seen there since. Like Prince Albert, it is protected by a belt of timber. July 29th, passed through a tract of a mile or so in width of unwinged grasshoppers, near Stony Creek (ten miles east of Little Saskatchewan River). None on the Little Saskatchewan, and only a few on the way thence to Fort Ellice. Very plentiful at Ellice in July, particularly about the 20th. Went away about the 25th. No grasshoppers seen on the way from Ellice to Battleford in August, though abundant in this region of country during July. Very abundant towards the foot of the Rocky Mountains and in the whole upper part of

the South Saskatchewan Valley, where they are said to have eaten up all the grass, driving the buffalo eastward to the vicinity of the Touchwood Hills, Souris Valley, etc.

Fort Calgary, Bow River, N. W. T. (John Bunn.) Did not appear here during the summer of 1876, but were reported as abundant on the plains to the eastward.

Fort Walsh, N. W. T. (J. M. Walsh.) Produced from the egg, hatching about the middle of May, and remaining till the middle of August, when they flew north-westward. Other swarms arrived on the wing from Montana, about the middle of July, and for some time thereafter. These also passed on to the north-west. All crops destroyed. No eggs left.

Fort Pitt, N. W. T. (W. McKay.) There were no grasshoppers within a distance of 300 miles west of this.

Prince Albert, N. W. T. (Bishop of Saskatchewan.) No visitation of grasshoppers.

Battleford, N. W. T. (T. Little.) Did not appear in 1876, and are never known to have reached this region.

Carleton House, N. W. T. (L. Clarke.) Grasshoppers were seen in huge swarms about 150 miles south of this, flying still southward. Did not appear here.

Swan River Barracks and Livingston, N.W.T. (F. Norman, J. H. Kittson, M.D. and R. Miller, M.D.) Produced from the egg, from about the 25th of May till June 1st, remaining till the 7th of August, when they departed north-eastward. (One report says they died in the country.) A few arrived from the south-west about the second of June, and alighted. Foreign swarms on the wing were observed passing overhead from the 20th to the 27th of July; but, owing to strong wind, they did not alight. These also went north-eastward, or eastward. About the 8th of August, great swarms appeared from the south-west, many alighting. These departed about the 10th of August, flying southward. All crops destroyed. No eggs deposited. For twelve years before July 1875, no grasshoppers were seen here. In 1876 the green crops were entirely destroyed before the middle of June, when the insect was no larger than the ordinary house-fly. Myriads are said by the Indians to have perished in lakes Winnipegosis and Winnipeg.

Swan Lake House, N. W. T. (D. McDonald) Not seen here in 1876; and during Mr. McDonald's experience of four years very few have visited this part of the country.

Little Saskatchewan, N. W. T. (K. McKenzie.) Second week of July a large flight observed going south one point west. Hatched in this country, and north-west of Lake Manitoba.

Manitoba House, N. W. T. (J. Cowie.) Produced from the egg about the first of June, leaving about the first of August, going south-eastward, or south-westward, according to the direction of the wind. On the first of August, foreign swarms were also observed, and these continued passing and occasionally alighting for about a week, going south-westward. Crops slightly injured. No eggs deposited.

Woodside, Man., (T. Collins.) None hatched here; but foreign swarms, more or less extensive, continued to pass over for six or eight weeks, coming from the north and north-west, and going southward. Some alighted; but it is stated that though in quantity, and remaining long enough to have destroyed the greater part of the crop, "strange to say, they did nearly no damage. They did not seem to have the same energy, nor did they eat voraciously as in former years."

Gludstone, Palestine P. O., Man., (C. P. Brown.) None hatched. Swarms observed to arrive on the wing on the 27th of July. These alighted and remained about nine days. Seen passing over for several days before, but did not alight. "They probably would not have alighted on this day, but for some misty showers or shadows of large clouds. They appeared to fall only in patches, probably the spaces covered by the shadows." Also continued to pass over for about two weeks after this date, but few came down. The insects came from north-west by north, and most of them probably went south-easterly. Loss of crops perhaps 5 or 6 per cent. No eggs deposited.

Oak Point, Lake Manitoba, Man., (J. Clarke.) Observed about the middle of July for two weeks, passing overhead at intervals, when the weather was clear and warm. Supposed to come from the western plains. General direction of flight, south-eastward. No eggs deposited. Many grasshoppers observed to fall into the lake, and in several places were afterwards washed up in windrows a foot thick along its margin.

Winnipeg, Man., (F. E. Cornish.) A few passed over in August, from north-west, going southward.

St. Boniface, Man., (Hon. M. A Girard.) None. Swarms from the west observed occasionally flying overhead, without alighting, during latter part of July and to middle of August.

Little Britain, Man., (Hon. D. Gunn.) No grasshoppers here. Ten or twelve miles west of Selkirk, however, a little colony covering about $1\frac{1}{2}$ acre hatched out, and were found more than half grown in the middle of July.

Lower Fort Garry, Man., (W. Flett.) None hatched here. A few seen passing overhead about the middle of August. They came with a south-west wind.

Crookston, Minn., (E. M. Welsh.) None hatched here. Were observed to pass overhead without alighting about the middle of July. Near the first of August some alighted, and stayed a day. Came from the north-west and north, and went south-eastward. No damage to crops. No eggs deposited.